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Communication

Peptide dendrimer-crosslinked inorganic-organic hybrid supramolecular hydrogel for efficient anti-biofouling

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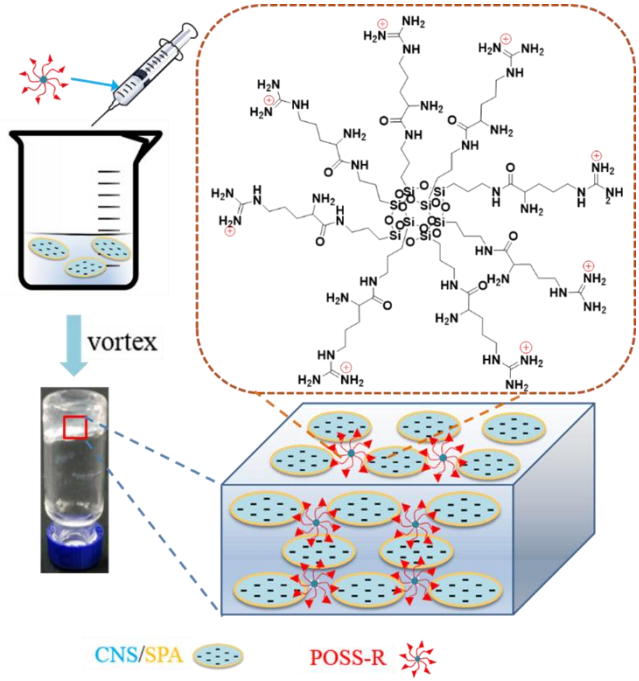
Graphical abstract



A novel kind of inorganic-organic hybrid supramolecular hydrogel with excellent anti-biofouling capability was developed. The hydrogel was formed via ionic interaction between the negative-charged sodium polyacrylate (SPA) entwined clay nanosheets (CNS) and positive-charged polyhedral oligomeric silsesquioxane (POSS) core-based generation one (*L*-Arginine) dendrimer (POSS-R).

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ABSTRACT

We reported a kind of inorganic-organic hybrid supramolecular hydrogel with excellent anti-biofouling capability. The hydrogel was formed *via* ionic interaction between the negative-charged sodium polyacrylate (SPA) entwined clay nanosheets (CNS) and positive-charged polyhedral oligomeric silsesquioxane (POSS) core-based generation one (*L*-Arginine) dendrimer (POSS-R). Due to their strong ionic interaction, this kind of hydrogel exhibited a rapid gelation behavior which accomplished even at a low POSS-R concentration about 1% w/v. With the increase of POSS-R concentration, these hydrogels appeared more compact structure, accompanied by remarkable enhanced mechanical strength. In addition, these hydrogels demonstrated rapid thixotropic response and shape-memory capability, as well as good biocompatibility. More importantly, these hydrogels exhibited outstanding anti-biofouling property due to the inherent anti-biofouling capability of SPA. Overall, these findings demonstrated a novel sort of inorganic-organic hybrid supramolecular hydrogel with tunable mechanical strength and excellent anti-biofouling capability, which may have a broad application potential in tissue engineering.

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